

# Mobile E-Commerce Portal

E. Carrillo<sup>1</sup>, S. Guerrero<sup>1</sup>, G. Pabon, J. Javier Samper<sup>2</sup>, J. Martínez<sup>2</sup>

<sup>(1)</sup>Universidad Autónoma de Bucaramanga  
COLOMBIA

<sup>(2)</sup> Universidad de Valencia  
SPAIN

*Abstract:* The new generation of Internet applications which permit the development of activities of electronic commerce are characterized by the inclusion of two new elements: mobility and wireless connections. In this paper is summarized the process developed in the implementation of a commercial mobile software prototype emphasizing the management of the data, the XML support and the possibility of generating adaptable content to different types of mobile devices and web clients.

*Key-Words:* MCommerce, WAP, XML, XSLT

## 1 Introduction

Diverse elements exist within the software layer of mobile commerce applications. One element to which special attention should be given is the way of adapting the content presented to the different devices that a user may potentially have, where the differences in capacity and resolution are constants. In this sense, the consortiums W3C and WAPForum, which regulate the standards for the Web and the Wireless Internet have posited work frameworks in order to solve this problem, the use of Composite Capabilities / Preferences Profile (CC/PP) and User Agent Profile (UAProf) [3], respectively.

This project summarizes the development of a prototype application for mobile commercial applications with support for different types of clients taking as a starting base the management of style pages and of transformations using XSLT.

## 2 Development

In the initial stages of the process it was established that the prototype should function in different mobile device models capable of: detailing the current movie listings in the main movie rooms, registering user names, validation of the user names already registered,

actualization of the data of pre-registered users, tickets reservations for different cinema functions, Database Administration via Web.

The strategy implemented in the prototype codification ensures the optimal acquisition of Web content information from different clients. This is achieved by using a combination of different technologies permitting the detection of the type of device accessing the prototypes which, the prototypes.

The prototypes transform the data extracted from a relational database into information codified in different markup languages. This allows the response set to the client's device to be presented in an appropriate format by which to interact with the prototypes.

The transformation process of markup languages in the prototypes begins by extracting data from the databases and converting them into XML (Extensible Markup Language) codified content. Then the data in XML is formatted using the documents codified in the XSL (Extensible Style Language) to determine the presentation of the XML data [4].

A document formatted in XSL consists in a series of rules which determine the transformation of an XML document into almost any other format. Finally, in order to achieve a transformation is useful to take the data codified

in XML, an appropriate XSL formatting page, an XML analyzer, and XSL translator. In this way the XSL translator creates an XML document transformed into a markup language or any other specified text format.

The markup languages generated by the transformation of the portals are the WML (Wireless Markup Language), the HTML, and the XHTML (eXtended Hypertext Markup Language) [4], which are an extension of HTML made by W3C, such that, a unified markup language is created, therefore a single XHTML codified document can be viewed from mobile devices, WebTv, and PCs, taking advantage of the relations between HTML and WM.

### 3. The final prototype

An object-oriented philosophy was used as the approach of analysis and design of the prototype. The application was designed using UML (Unified Modeling Language) [2].

The technologies employed to develop the core of the project were:

- Operating system: Linux, Redhat version 7,1 (kernel 2,4,2-2)
- Server HTTP: Apache v 1.3.19
- Database Management System: MySQL v. 3.23.37
- Development of dynamic applications Web: PHP (Hipertext Processor) v 4,0,6 , with extensions for support to XML.

MySQL, a server multithread based on the standard SQL, (Structures Query Language) was the client/server database management system This system, although it does not allow an appropriate support for developments on a great scale due to its limitation in handling stored procedures, but it is an appropriate option for test developments.

PHP acts as a high level interpreted language, whose scripts can be embedded in documents codified in a markup language and executed in the Web server. PHP is shaped as a module of the Web server Apache through the CGI

(Common Gateway Interface) gateway which allows interaction with different database management systems [1].

The PHP functionalities can be increased by means of extensions, groups of functions that can be activated when settling or by means of directives defined in the associated configuration file. In the case of interaction with XML, an extension to interpret and validate documents codified in XML is required. For that purpose, XML analysers, available in some distributions of Linux were used. An additional extension was employed to develop transformations of documents codified in XSL.

Figure 1 illustrates the basic information flow diagram of the Movie Listings WAP Portal, in a data flow diagram (DFD). The DFD shows the flow information and the transformations which are applied to the data from entry point to exit.

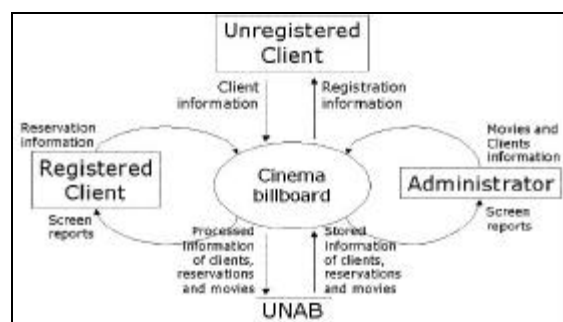


Figure 1. Portal's Data Flow Diagram

Figure 2 illustrates the Use Case Diagram for the application of the Movie Listings WAP Portal

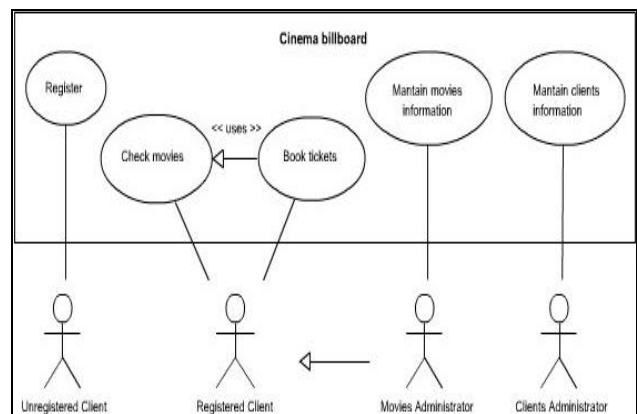


Figure 2. Portal's Use Case Diagram

In general the function of the prototype depends on various archives codified in PHP (pages which the user would use and libraries which these would necessitate ) [1], of archives codified in XSL (the transformations for each of the documents in WML, XHTML and HTML formats), and of the data extracted (codified in XML) and modified via SQL clauses in the database.

Figure 3 illustrates the Web diagram [2] of the prototype according to the Web extension of UML. The diagram represents the general functioning of the prototype, specifying the relations amongst its components in real time execution.

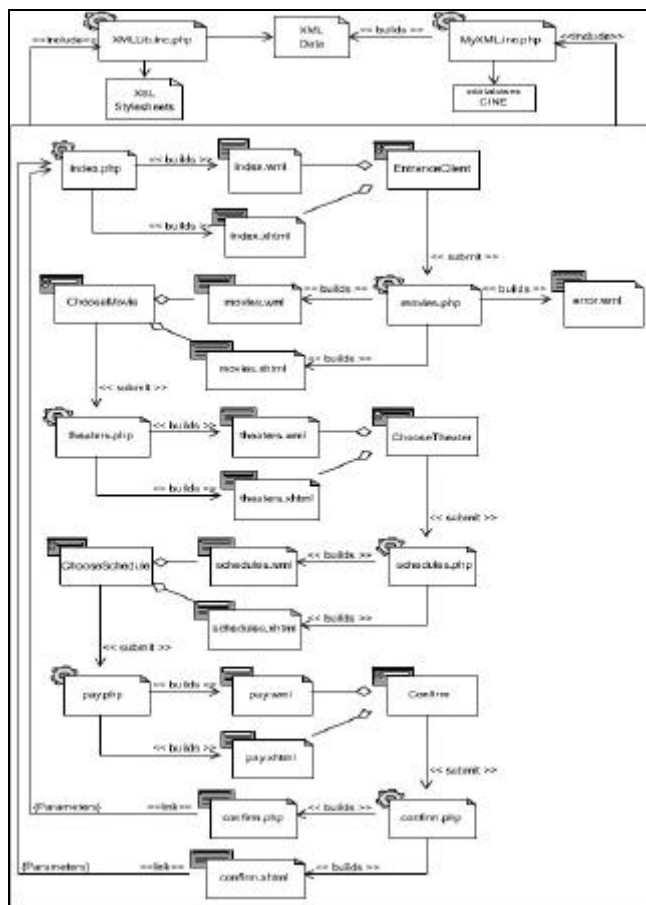


Figure 2. Portal's Web diagram

#### 4 Conclusion

This paper presented a summary of the way in which the problem of content creation was approached for different types of clients in a mobile e-commerce application. The proposed solution is based on the detection of the

characteristics of the user agents expected in the application as well as in the support allotted by XML as the standard in the management of the data, coupled with XSL and XSLT, allow the adaptation of the appropriate format required by each mobile device.

#### References:

[1]. Carrillo E. Server-Side Scripting With Databases Using ASP, PHP, Cold Fusion and Java Servlets. 5th WSES/IEEE World Multiconference on Circuits, Systems, Communications & Computers (CSCC 2001), Crete, Greece, September, 2001

[2] Conallem, Jim. Building Web Applications with UML. Addison-Wesley, 1999.

[3] Device Independence Activity, <http://www.w3.org/2001/di/>. June, 2001.

[4] WirelessDev.Net. XML and XHTML. <http://www.wirelessdevnet.com/channels/wap/training/xslt.html>.

*This project has been presented with the sponsor of the Instituto de Robotica and International Relations Direction of Universidad de Valencia, and Colciencias in Colombia.*